Phase boom for an electromagnetic wave in a ferromagnet

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Résumé en anglais	We study the propagation of an electromagnetic wave with a high intensity in a ferromagnetic medium, in a way analogous to the mathematical theory of nonlinear geometric optics. We find that the evolution of the modulation of a quasi-monochromatic plane wave is described by a nonlinear transport equation. In the simplest case, we retrieve a result described by other models: the main nonlinear effect is a phase modulation proportional to both the time and the square of the amplitude of the wave. But the most interesting feature is that the rapidly oscillating wave generates slowly varying waves that belong to soliton propagation modes, and that the latter react on the former by a phase factor. Two regimes occur, depending whether the slowly varying waves travel slower or faster than the modulation of the rapidly oscillating wave. An analogue to the boom of a supersonic airplane can thus be observed in the phase modulation of the incident wave.
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